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On-Farm Corn Fungicide Trials

Abstract

An application of fungicide to corn has become a popular input with many farmers in Iowa. The effect of fungicide on corn yield, however, can vary from year to year. Environmental conditions, such as rainfall and temperature, likely are the main factors for differences in how a fungicide affects corn yield because these factors influence disease development and crop growth. Because environmental conditions vary from one year to the next, it is difficult to predict how and when to use a fungicide. Compilation of trial data over many years could help identify factors associated with fungicide response in corn.

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On-Farm Corn Fungicide Trials

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Introduction

An application of fungicide to corn has become a popular input with many farmers in Iowa. The effect of fungicide on corn yield, however, can vary from year to year. Environmental conditions, such as rainfall and temperature, likely are the main factors for differences in how a fungicide affects corn yield because these factors influence disease development and crop growth. Because environmental conditions vary from one year to the next, it is difficult to predict how and when to use a fungicide. Compilation of trial data over many years could help identify factors associated with fungicide response in corn.

Materials and Methods

In 2014, there were 24 on-farm trials in Iowa that evaluated the effect of fungicide on corn yield (Table 1). All trials were conducted on-farm by farmer cooperators. Fungicide treatments were applied by ground equipment and were arranged in a randomized complete block design with at least three replications per treatment. Strip size varied from field to field depending on equipment size and the size of the field. All strips were machine harvested for grain yield.

In 14 trials (1, 2, 8, 9, 10, 11, 14, 16, 17, 18, 19, 20, 22, and 23) Stratego YLD[®] at 2-4 oz/acre, Priaxor[™] Xemium[®] at 4 oz/acre, or Asters[™] + $\alpha\beta$ PRO[™] at 4 + 0.5 oz/acre were applied at V5-V6. In eight trials (3, 4, 5, 6, 7, 12, 13, and 15) Headline AMP[®] at 10 oz/acre,

Quilt Excel[®] at 10.5 oz/acre, Aproach[®] at 6 oz/acre, or Stratego YLD[®] at 4 oz/acre were applied at R1-R2. In Trial 21, Fortix[®] at 5 oz/acre was applied at V10 to two corn hybrids. In Trial 24, Priaxor[™] Xemium[®] at 4 oz/acre at V6 was compared with applications of Priaxor[™] Xemium[®] at 4 oz/acre at V6 followed by Headline AMP[®] at 10 oz/acre at R1 and an application of Headline AMP[®] at 10 oz/acre at R1. These treated strips were compared with an untreated control in each trial. Corn was evaluated for foliar diseases two weeks after the last fungicide application in Trial 24.

Results and Discussion

There was not a significant yield increase with the fungicide in any of the 14 trials with the applications made at V5-V6 (Table 2). There was a significant yield increase with the R1-R2 fungicide applications of Headline AMP[®] in Trials 3, 5, 13, and 15 ($P = 0.05$). There also was a nearly significant yield increase ($P < 0.10$) in Trials 4 and 7 with the fungicide application. However, with corn prices at less than \$4/bushel, the fungicide application likely was profitable in only 2 out of the 24 trials (Trials 3 and 15). Across all 24 trials, the fungicide-treated strips yielded an average of less than 3 bushels/acre more than the untreated. It likely would require a yield increase of over 7 bushels/acre to pay for a fungicide application with current corn prices.

Plant disease assessments made in Trial 24 (Table 3), two weeks after the R1 application, indicated low levels of Northern corn leaf blight and common rust across all strips. The fungicides did not have a significant effect on corn yields in this trial. Although plant disease evaluations were not made in the other trials, it is likely there was disease present in the two trials where there was an economic response to the fungicide and little disease incidence in

trials with little-to-no yield response to the fungicide. This indicates the importance of evaluating plant disease incidence and the likelihood of disease problems with current

weather conditions and hybrids selected in making decisions on the use of foliar fungicides in protecting corn yield.

Table 1. Hybrid, row spacing, planting date, planting population, previous crop, and tillage practices in on-farm corn fungicide trials in 2014.

Exp. no.	Trial	County	Hybrid	Row spacing (in.)	Planting date	Planting population (seeds/A)	Previous crop	Tillage
140150	1	Lyon	Producers 6108 STX RIB	30	5/2/14	35,000	Soybean	Conventional
140155	2	Lyon	DK 4929	30	5/9/14	33,800	Soybean	Conventional
140157	3	Sioux	Pioneer 193	30	4/26/14	34,300	Oats	Conventional
140158	4	Sioux	Pioneer 448AMX	30	5/5/14	34,300	Soybean	Conventional
140159	5	Sioux	Pioneer 448AMX	30	5/5/14	34,300	Soybean	Conventional
140160	6	Sioux	Pioneer 448AMX	30	5/5/14	34,300	Soybean	Conventional
140161	7	Sioux	Pioneer 448AMX	30	5/5/14	34,300	Soybean	Conventional
140164	8	Lyon	DK 5356	22	5/5/14	VR 36-37	Corn	Conventional
140180	9	Lyon	DeKalb 5356	22	4/26/14	VR 36-37	Corn	Conventional
140181	10	Lyon	DeKalb 5356	22	4/26/14	VR 36-37	Corn	Conventional
140167	11	Lyon	Pioneer 407AMXT	22	5/5/14	VR 36-37	Soybean	Conventional
140169	12	Lyon	Producers 6108 STX RIB	30	5/2/14	35,000	Soybean	Conventional
140112	13	Osceola	DK 4812	30	4/23/14	34,700	Soybean	Conventional
140146	14	Lyon	Pioneer 407AMXT	22	5/5/14	VR 36-37,000	Corn	Conventional
140148	15	Lyon	DK 5259	30	5/3/14	35,000	Soybean	Conventional
140712	16	Henry	Pfister 2770	30	5/4/14	34,000	Soybean	Conventional
140703	17	Washing-ton	DKC 62-98	30	5/5/14	36,000	Soybean	No-till
140183	18	Lyon	Pioneer 9834 AMX	22	5/3/14	36,500	Corn	Conventional
140109	19	Osceola	DK 4812	30	5/6/14	33,800	Corn	Conventional
140104	20	Lyon	Pioneer 193	20	5/25/14	34,300	Corn	Conventional
140215	21	Buena Vista	Golden Harvest 9E98-3000GT and 2W74-3000GT	30	5/9/14	35,400	Soybean	Spring disc, field cultivate
140176	22	Lyon	Producers 6108 STX RIB	30	5/2/14	35,000	Soybean	Conventional
140177	23	Lyon	Producers 6108 STX RIB	30	5/2/14	35,000	Soybean	Conventional
140701	24	Louisa	Burris 7B23	30	4/22/14	35,000	Soybean	No-till

Table 2. Yields of on-farm corn fungicide trials in 2014.

Exp. no.	Trial	Treatment	Rate (oz/A)	Application timing	Yield (bushels/A)			P-value ²
					Fungicide	Control	Response	
140150	1	Stratego YLD	2	V6	163	161	2	0.56
140155	2	Priaxor Xemium	4	V6	201	200	1	0.68
140157	3	Headline AMP	10	R2	220	207	13	0.02
140158	4	Stratego YLD	4	R1	201	196	5	0.07
140159	5	Headline AMP	10	R1	201	196	5	0.02
140160	6	Quilt Xcel	10.5	R1	193	195	-2	0.88
140161	7	Aproach	6	R1	199	196	3	0.06
140164	8	Stratego YLD	4	V6	197	195	2	0.53
140180	9	Stratego YLD	4	V6	197	198	-1	0.77
140181	10	Stratego YLD	4	V6	205	202	3	0.29
140167	11	Stratego YLD	4	V6	149	151	-2	0.51
140169	12	Headline AMP	10	R1	186	184	2	0.26
140112	13	Headline AMP	10	R1	191	186	5	0.03
140146	14	Stratego YLD	4	V6	160	156	4	0.18
140148	15	Headline AMP	10	R1	177	167	10	<0.01
Astera + αβ			4 +0.5					
140712	16	PRO		V5	233	233	0	0.88
140703	17	Priaxor Xemium	4	V6	221	223	-2	0.28
140183	18	Stratego YLD	4	V6	185	182	3	0.19
140109	19	Priaxor Xemium	4	V5	151	144	7	0.56
140104	20	Stratego YLD	4	V6	189	182	7	0.14
140215	21a ¹	Fortix	5	V10	188	188	0	0.89
	21b	Fortix	5	V10	190	191	-1	0.89
140176	22	Stratego YLD	2	V6	166	169	-3	0.65
140177	23	Stratego YLD	4	V6	190	188	2	0.38

¹Variety was Golden Harvest 9E98-3000GT for 21a and Golden Harvest 2W74-3000GT for 21b.

²P-Value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-Value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.

Table 3. Yield from on-farm corn fungicide trial in 2014.

Exp. no.	Trial	Treatment	Rate (oz/A)	Application timing	Yield (bu) ¹	P-value ²
140701	24	Control			222 a	0.13
		Prioxor Xemium	4	V6	222 a	
		Headline AMP	10	R1	231 a	
		Prioxor	4	V6 +		
		Headline AMP	10	R1	230 a	

¹Values denoted with the same letter are not statistically different at the significance level 0.05.

²P-Value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-Value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.